PATENT SPECIFICATION (11) 1 337 586

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DRAWINGS ATTACHED

(21) Application No. 26393/70 (22) Filed 1 June 1970

(23) Complete Specification filed 1 June 1971

(44) Complete Specification published 14 Nov. 1973

(51) International Classification B60N 1/08

(52) Index at acceptance

A4J 232 240 244 250 252 254 256 270 272 274 284 288 28X 300 315 31Y 340 348 375 37Y 386 389 38Y 40X

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(19)

(54) IMPROVEMENTS IN OR RELATING TO VEHICLE SEATS, ESPECIALLY FOR AIRCREW

(71) We, TELEFLEX LIMITED, a British Company of Christopher Martin Road, Basildon, Essex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to vehicle seats. It is concerned more particularly, but not exclusively, with seats for pilots and other aircrew members.

Aircrew members need adjustable seats and one necessary adjustment is seat travel along the aircraft floor. For this purpose aircrew seats are commonly mounted on floor rails. Sometimes the seat track is straight but there is also a requirement for seats capable of tracking along a path that changes direction. Also, since seat adjustment often has to be effected during flight there is a need for seats that track under power instead of requiring manual adjustment.

It is an object of this invention to achieve a seat construction and mounting which is an improvement in some or all of these respects over seats hitherto available.

According to the present invention, there is provided a vehicle seat mounted on a floor track for positional adjustment, wherein the seat is equipped with mounting means giving three-point support on a three-rail track, said three-rail track having two outside support rails and a centre support and guide rail, said centre support and guide rail having locking and traction means operably attached thereto and adapted to engage respectively with locking and driving means mounted on the frame of said seat, said driving means and said locking means mounted on said seat frame including a swivelling bogie mounted centrally on said seat frame.

Tracking of the seat under power may be accomplished through the meshing of a drive pinion or pinions on the bogie with rack teeth along the centre rail of the floor track. Locking may be achieved by the engagement of a withdrawable toothed lock member on the bogie with the rack teeth on the rail. In this way, a seat mounting is obtained, with power drive and locking facilities, that nevertheless enables the seat to negotiate bends in the floor track quite readily.

The power drive to the swivelling bogie preferably includes a slipping clutch that will enable speed run down of the drive motor to take place in a normal manner after the seat is positively locked on its track. This clutch may be a friction clutch and a particularly advantageous feature is the incorporation of means to relieve the clutch pressure automatically and thereby, in effect, largely or entirely disengage the drive through the clutch, when a sudden rise in clutch torque indicates that the output shaft has locked. Manual disengagement of the clutch is also made possible in order that the user shall not be prevented from adjusting the seat position manually if the power drive should fail or a power supply be unavailable.

One arrangement in accordance with the invention will now be described by way of example, with reference to the accompanying drawings, in which:—

Figure 1 shows an aircrew seat in rear elevation,

Figure 2 is a side elevation of the seat,

Figure 3 is a sectional elevation of a gear and clutch unit on the seat for transmitting the motor drive to the drive bogie,

Figure 4 is a plan view of the unit of Figure 3,

Figure 5 is a view of the unit of Figure 3 seen in the direction of the arrow 5,

[Price 25p]

Figure 6 is a plan of the drive bogie,

Figure 7 is a view partly in section on the line 7—7 of Figure 6,

Figure 8 is a part sectional view on the line 8—8 of Figure 6, and

Figure 9 is a view on the line 9—9 of Figure 7.

Figures 1 and 2 of the drawings show an aircrew seat which is described in more detail and claimed in our patent application No. 26392/70 (Serial No. 1,337,585). The seat has a base 11 which is mounted for positional adjustment fore-and-aft along a floor track comprising two side rails 12 and a centre rail 13. The seat base has three-point support from two laterally-spaced rear trolleys or bogies 10 running on the side rails 12, and a central forward bogie 30 running on the centre rail. The side rails 12 merely support, guide and hold-down the seat base, but the centre rail is also a traction and locking rail that co-operates with power driving and locking means on the central bogie on the front of the seat base. The drive bogie 30 is shown in Figures 6 to 9 of the drawings; and a clutch unit for transmitting power drive to the bogie is shown in Figures 3 to 5.

Referring now to Figures 3 to 5, the clutch has a rotary clutch housing 14 above which is a non-rotary gear case 15. A worm wheel 16 disposed centrally in the gear case on a vertical shaft 17 is in mesh with a horizontal worm 18 that is driven by an electric motor (not shown). The shaft 17 depends into and drives the rotary clutch housing 14 which in turn drives a further shaft 19, in alignment with the shaft 17, through a friction disc assembly 20. The driving member of the friction disc assembly 20 is a ring 21 surrounding the annular friction discs. A roller thrust bearing 22 is interposed between the friction disc assembly and the upper wall of the clutch housing. The driven clutch member 23, surrounded by the annular friction disc assembly 20, is constituted by an enlarged head on the upper end of the shaft 19, which shaft passes out downwardly through the lower wall of the clutch housing. The annular friction discs of the clutch are urged into engagement by a flanged ring 24 which encircles the shaft 19 and is pressed up toward the clutch discs by a set of disc springs 25 also encircling the shaft 19.

When the clutch is transmitting power normally to the output shaft 19 the clutch housing 14 rotates as one with both shafts. The driving clutch ring 21 encircling the clutch discs is itself driven by the clutch housing through a set of balls 27 lodged in recesses 28, 29 in the ring and the clutch housing wall, respectively. Upon the output shaft 19 becoming locked against rotation, which occurs when the seat is locked to the rail 13 as hereinafter described, the increased clutch torque causes the balls 27 to be cammed out of their recesses 28, 29, which taper in opposite directions of rotation, by limited relative angular movement of the clutch housing and the driving ring 21 The ring 21 is consequently urged downward against the radial flange 31 of the flanged ring 24 and thereby relieves the pressure on the clutch friction disc assembly 20 by movement downward of the ring 24 against the action of the disc springs 25. This effectively disengages the drive from the shaft 19 and allows the drive motor to lose speed progressively even although the shaft 19 is already locked. When the seat is unlocked and the drive motor is restarted, relative rotation of the clutch housing and driving ring 21 occur until the balls 27 re-engage in their recesses 28, 29.

For effecting manual disengagement of the clutch, so that the seat position can be shifted manually if the drive should fail or no power supply be available, a collar 32 surrounds a necked lower portion of the gear case 15 and is angularly movable manually. This collar is urged up by a spring 33 toward a non-rotary plate 34 fixed to the gear case, and a set of balls 35 is accomodated in recesses 36, 37 provided respectively in the collar 32 and the plate 34. These recesses taper in opposite directions, like the recesses 28, 29, so that when the collar is moved angularly it is cammed downward against the action of the spring 33. This brings it into engagement with a roller thrust bearing 38 on a rotary carrier 39 that rotates with the clutch housing, the carrier 38 being borne above the clutch housing by a set of bolts 40 passing slidably through the top wall of the clutch housing and into the driving ring 21. The downward movement of the collar 32 in turn causes downward movement of the assembly comprising the roller bearing 38 the carrier 39 and the bolts 40, and therefore the bolts carry down the driving ring 21 to force down the flanged ring 24 as before and the clutch is disengaged. To enable the aforesaid limited relative rotation of the driving ring 21 and clutch housing to take place and bring about disengagement of the clutch when the unit is running under power, the holes in the top wall of the clutch housing through which the bolts 40 pass are formed as slots.

Turning now to Figures 6 to 9 of the drawings, the front centre drive bogie 30 is mounted in the seat base 11 for swivelling about the axis 41 of the clutch unit which lies above it. The output shaft 19 of the clutch unit drives a central gear 42 on the bogie which is in mesh with two off-set pinions 43 that are carried by shafts 44 extending vertically through to the un-

derside of the bogie. Two further pinions 45 on the lower ends of the shafts 44 are in mesh with the teeth of a continuous rack bar 46 secured along the top of the centre floor rail 13, thereby to accomplish the power tracking of the seat. The bogie runs on the rack bar on a pair of rollers 47 disposed in tandem, and the two pinions 45 engage the rack bar at positions on the same side of the rail, and mutually displaced along it, that are laterally opposite, respectively, the two rollers 47.

Between the two pinions 45, on the same side of the rail, there is provided a withdrawable locking member 48 which is generally similar to that described in our patent application No. 34872/69 (Serial No. 1,315,305) in that it has teeth 49 to engage the rack bar teeth and a toggle-type linkage 50 for shifting it into and out of engagement. The locking member 48 slides in a shoe 51 which is united with another shoe 52 on the opposite side of the rail by cross-head 54 sliding transversely in a guide 55 in the main body of the bogie 30. The complete shoe assembly and locking mechanism is thus able to slide horizontally in the direction at right angles to the rail as the bogie travels, which feature enables the locking mechanism to negotiate curved rails. The rail 13 has an undercut head 53 and the two shoes 51, 52 contact opposite sides of this head and have projecting portions 56 engaging underneath it to hold down the seat.

WHAT WE CLAIM IS:—

1. A vehicle seat mounted on a floor track for positional adjustment, wherein the seat is equipped with mounting means giving three-point support on a three-rail track, said three-rail track having two outside support rails and a centre support and guide rail, said centre support and guide rail having locking and traction means operably attached thereto and adapted to engage respectively with locking and driving means mounted on the frame of said seat, said driving means and said locking means mounted on said seat frame including a swivelling bogie mounted centrally on said seat frame.

2. A seat according to claim 1, wherein for traction of the seat under power, a drive pinion or pinions on the bogie meshes with rack teeth along the centre rail of the floor track.

3. A seat according to claim 2, wherein for locking of the seat, a withdrawable toothed lock member on the bogie engages with the rack teeth on the centre rail.

4. A seat according to claim 2 or claim 3, wherein the power drive to the swivelling bogie includes a slipping clutch to enable speed run down of the drive motor to take place after the seat is positively locked on its track.

5. A seat according to claim 4, wherein the clutch is a friction clutch.

6. A seat according to claim 5, including means whereby the clutch pressure is relieved automatically when a sudden rise in clutch torque indicates that the output shaft has locked.

7. A seat according to claim 6 or claim 7 or claim 8, including means for effecting manual disengagement of the clutch.

8. A seat according to claim 6, or claim 7 when appendant to claim 6, wherein the clutch is a friction disc clutch and the motor drive is applied to one set of friction discs through an assembly comprising rotary driving and driven members spring-urged toward one another and having mutually adjacent opposed radial faces with balls interposed between them which balls are lodged in oppositely tapering recesses in the two faces, whereby when the condition of maximum torque is reached said driving and driven members are cammed away from one another by reason of the balls riding partially out of the recesses, the resulting relative axial movement being employed to relieve the pressure engaging the clutch discs.

9. A seat according to any one of claims 4 to 8, wherein the clutch has a vertical output shaft in alignment with the central axis of the bogie, and a central gear on the bogie is driven by this shaft and in turn drives two pinions in mesh with the rack teeth on the centre rail which pinions lie fore-and-aft of the central axis of the bogie and are both on the same side of the rail.

10. A seat according to claim 9 when appendant to claim 3, wherein the lock member is disposed mid-way between the two drive pinions in transverse alignment with the central axis of the bogie.

11. A seat according to claim 3 or claim 10, wherein the lock member is slidably mounted in one of a pair of opposed shoes on opposite sides of the rail which shoes are united by a crosshead above the rail that can slide horizontally on the bogie in the direction at right angles to the rail to enable the shoe assembly and locking mechanism to negotiate rail curves.

12. A seat according to claim 11, wherein the shoes have projections that underlie the head of the rail so as to hold the seat down on the rail.

13. A vehicle seat according to claim 1 and substantially as herein described with reference to the accompanying drawings.

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Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1973.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

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8 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

FIG.1.

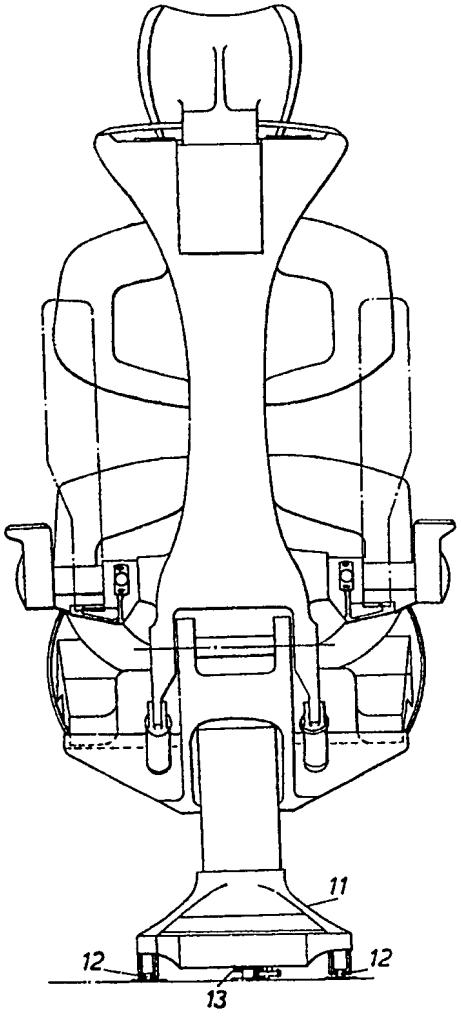


FIG.2

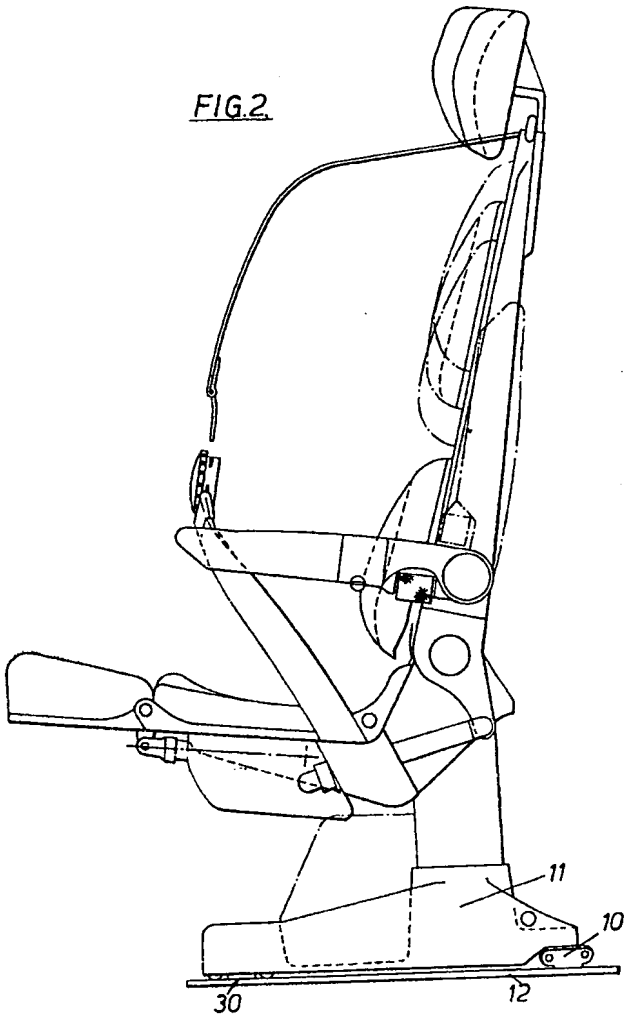
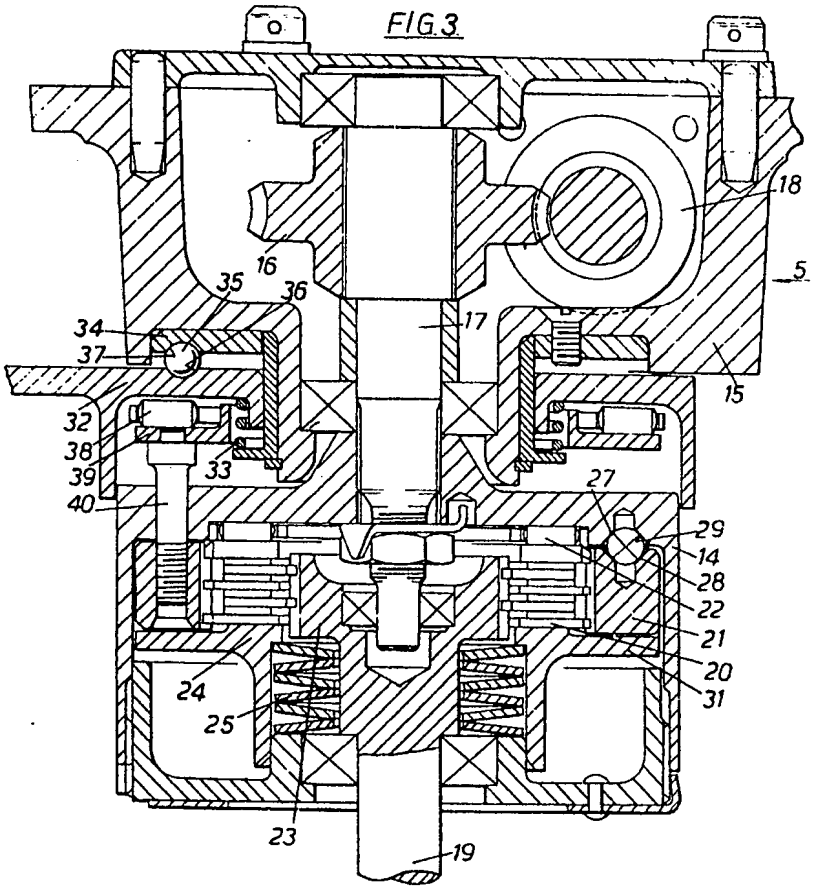


FIG.3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1337586 COMPLETE SPECIFICATION
8 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 4

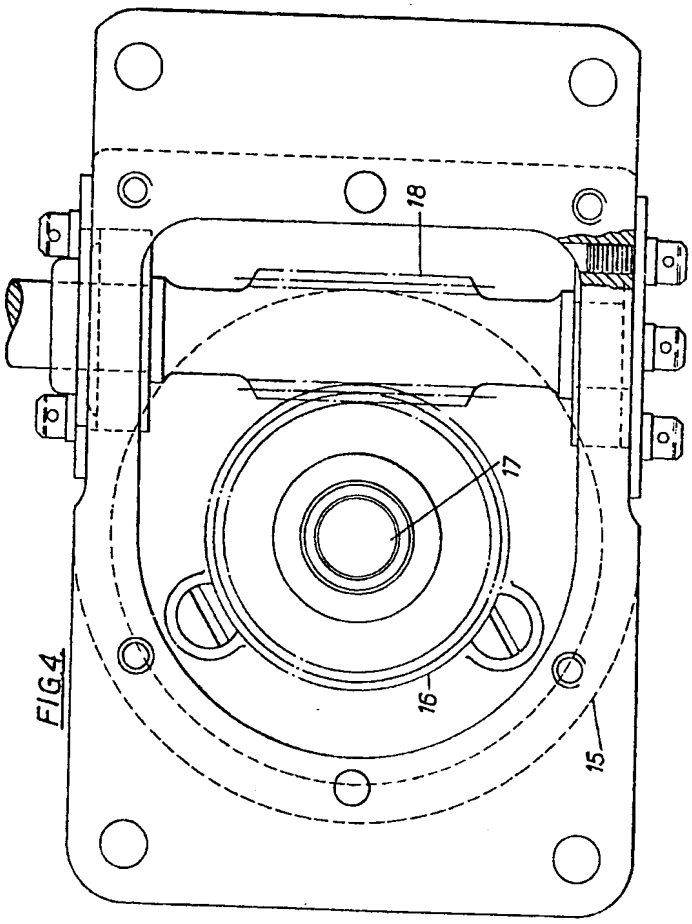

FIG4

FIG.5.

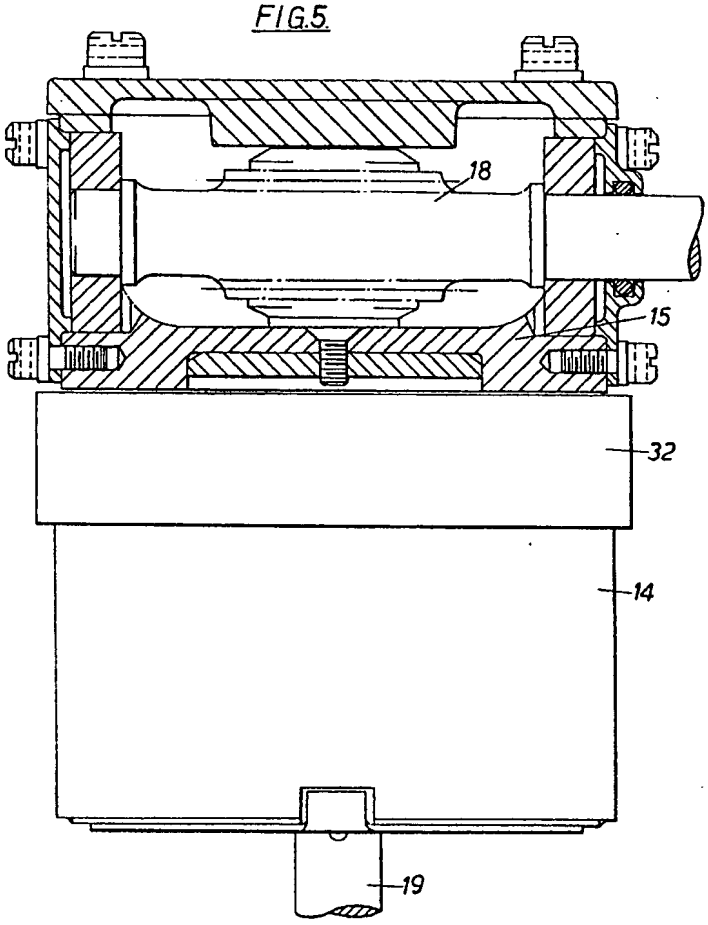

FIG.6.

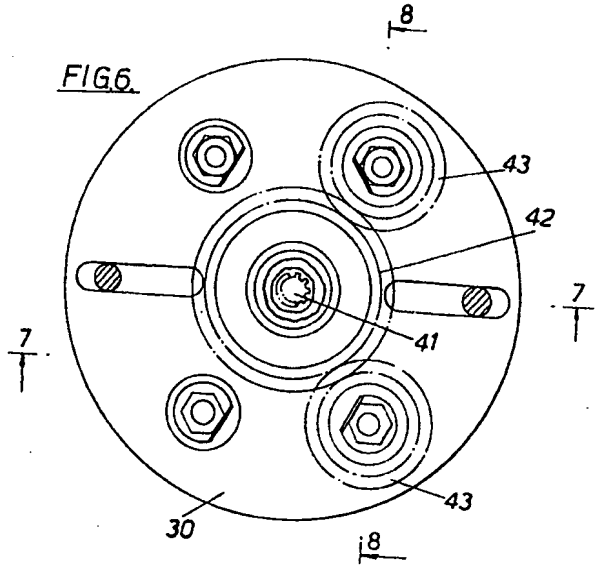

FIG.8.

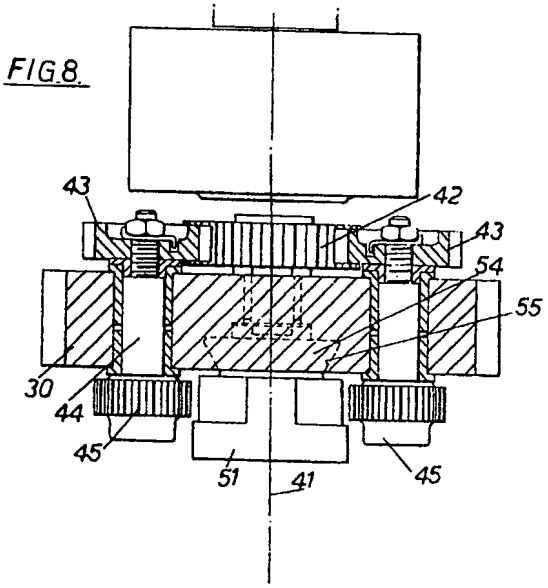

FIG.7

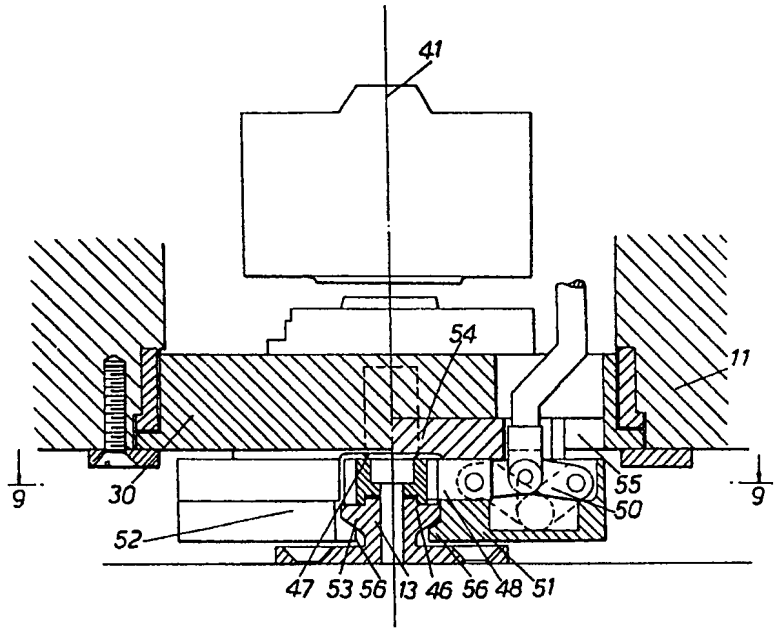

FIG 9